
PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Shoshone-Bannock/Shoshone Paiute Joint Culture Facility

BPA project number: 9500600

Contract renewal date (mm/yyyy): 10/1999 ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding

Shoshone-Bannock Tribes

Business acronym (if appropriate) SBT

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses

10.3E.9, 10.8C.6, 10.3E.11, 10.8C.7

FWS/NMFS Biological Opinion Number(s) which this project addresses

Other planning document references

Short description

Planning, development, and operation of a hatchery facility to provide native trout for re-introduction of stocks affected by hybridization, habitat loss, and exploitation on the Duck Valley and Fort Hall Reservations

Target species

Yellowstone cutthroat trout and redband trout

Section 2. Sorting and evaluation

Subbasin
Upper Snake

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input type="checkbox"/> Anadromous fish <input checked="" type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Multi-year (milestone-based evaluation) <input type="checkbox"/> Watershed project evaluation	<input type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input checked="" type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input checked="" type="checkbox"/> Research & monitoring <input checked="" type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
9201000	Habitat Restoration/Enhancement Fort Hall Reservation	Provides conditions for re-introduction of native Yellowstone cutthroat trout on Fort Hall Reservation

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1992	Feasibility study report, joint culture facilities for the resident fish substitution program on the Snake River above Hells	

	Canyon in Idaho, CH2M Hill, Boise, ID	
1996	The Shoshone-Bannock and Shoshone-Paiute Tribes master plan for the Fort Hall resident fish hatchery, Montgomery Watson, 671 Riverpark Lane, Suite 200, Boise, ID	
1997	Emerson, S. and L. Boreson, PI J.R. Galm. 1997. Cultural resources survey of three proposed fish hatcheries in southeastern Idaho, Bingham and Power Counties #534, Archaeological and Historical, Eastern Washington University.	
1998	Upper Snake River Fish Culture Facility, Environmental Assessment, DOE/EA-1213, Bonneville Power Administration, PO Box 3621, Portland, OR 97208	
1998	Purchase of property and transfer in trust to the Shoshone-Bannock/Shoshone-Paiute Tribes	

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Surveys will be performed to identify pure populations of cutthroat trout and redband trout on the Fort Hall and Duck Valley Reservations, respectively.	a	Electrofishing or snorkeling 60 + streams to visually identify pure strains of Yellowstone cutthroat and redband trout
		b	Reference samples collected (fin clips) from 15-20 fish per population. Allozyme confirmation of reference sample identity.
		c	Screen of introns to identify useful markers. Identification of pure populations of Yellowstone cutthroat and redband trout.
2	Protect habitat containing remaining pure populations of redband and/or cutthroat trout.	a	Streams with pure populations of Yellowstone cutthroat protected from grazing influences with use of rest-rotation grazing and/or fencing.
3	Collect baseline data on characteristics of streams with remnant populations of native fishes.	a	Survey for information on habitat types, pool-riffle ratios, slope, aspect, temperature, canopy, etc.

4	Select streams for re-introduction of native fishes.	a	Survey for information on habitat types, pool-riffle ratios, slope, aspect, temperature, canopy, natural barriers, absence of non-native fishes.
		a	Select streams for re-introduction based upon physical and biological characteristics and absence of non-native fishes.
5	Collect broodstock or gametes from those populations identified as being genetically pure Yellowstone Cutthroat trout and/or redband trout.	a	Assess size of native fish populations; collect brood stock or gametes, depending upon population size (> than 2,000 - broodstock).
		b	Test broodstock or gametes for disease before introduction into hatchery setting.
		c	Maintenance of native broodstock in a hatchery setting.
6	Produce Yellowstone cutthroat, redband, and domestic rainbow trout. Specific numbers are stated in Tasks a-c.	a	48,000 10" domestic rainbow trout catchables produced yearly for put-and-take fisheries in enclosed reservoirs. 8,000 10" Yellowstone cutthroat trout catchables produced yearly.
		b	350,000 eyed Yellowstone cutthroat trout eggs, and 8,000 10" catchables produced yearly.
		c	350,000 eyed redband trout eggs produced yearly.
7	Outplant domestic rainbow trout to enclosed terminal reservoirs. Specific objective: two put-and-take rainbow fisheries on Fort Hall and Duck Valley Reservations.	a	Outplant 48,000 10" domestic rainbow to enclosed reservoirs on Duck Valley and Fort Hall Reservations. (outplants tested for disease)
		b	New populations will be monitored yearly (snorkeling and/or electrofishing) to document survival, growth, and reproduction
		c	Areas adjacent to put-and -take domestic rainbow fisheries will be monitored post release for any evidence of fish escaping enclosed areas.
8	Outplant eyed eggs to hatchboxes	a	700,000 eyed eggs outplanted using

	in select streams on the Fort Hall and Duck Valley Reservations. Specific objective: 20 self sustaining populations of native Yellowstone cutthroat and redband trout on Fort Hall and Duck Valley reservations.		hatchboxes on Duck Valley and Fort Hall Reservations (outplants tested for disease).
		b	Re-introductions will be monitored to determine when self-sustaining populations (> 300 spawning pairs yearly) have been established.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	4/1999	6/2001	All pure populations on Fort Hall and Duck Valley reservations identified.	X	30.00%
2	8/1999	6/2020	Protection of habitat containing remaining pure populations of redband and/or cutthroat trout.		20.00%
3	8/1999	6/2001	Baseline data will be collected on characteristics of streams with remnant populations of native fishes.	X	20.00%
4	8/1999	6/2001	Select streams for re-introduction of native fishes.	X	10.00%
5	6/2001	6/2020	Broodstock or gametes will be collected from those populations identified as being genetically pure Yellowstone Cutthroat trout and/or redband trout.		0.00%
6	6/2002	6/2020	Production of Yellowstone cutthroat, redband, and domestic		0.00%

			rainbow.		
7	6/2001	6/2020	Two put-and-take rainbow fisheries on Fort Hall and Duck Valley Reservations.	X	0.00%
8	6/2002	6/2020	20 self sustaining populations of native Yellowstone cutthroat and redband trout on Fort Hall and Duck Valley reservations.	X	0.00%
				Total	80.00%

Schedule constraints

Schedule constraints include; delays in construction of hatchery facility, completion of NEPA for outplanting of native fishes, unforeseen problems within hatchery populations.

Completion date

2020

Section 5. Budget

FY99 project budget (BPA obligated): \$249,161

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	One FTE, two part time personnel	% 19	54,000
Fringe benefits	34% of salaries	% 6	18,360
Supplies, materials, non-expendable property	Additional funds necessary for hatchery startup.	% 22	61,000
Operations & maintenance	Feed, power, oxygen	% 22	61,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		% 0	0
NEPA costs		% 0	0
Construction-related support		% 0	0
PIT tags	# of tags:	% 0	0
Travel		% 1	3,000
Indirect costs	28% of Salary and Fringe	% 7	20,261
Subcontractor	Genetic inventory of native fishes	% 21	60,000
Other	Pickup lease	% 2	5,000

TOTAL BPA FY2000 BUDGET REQUEST	\$282,621
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Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
		%0	
		%0	
		%0	
		%0	
Total project cost (including BPA portion)			\$282,621

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	\$300,000	\$300,000	350,000	\$350,000

Section 6. References

Watershed?	Reference
<input type="checkbox"/>	Dwyer, W.P. and B.D. Rosenlund. 1988. Role of fish culture in the re-establishment of greenback cutthroat trout. American Fisheries Society Symposium, 4:25-36.
<input type="checkbox"/>	Emerson, S. and L. Boreson. 1997. A cultural resources survey of three proposed fish hatcheries in southeastern Idaho, Bingham and Power Counties., P.I., J.R. Galm, Short Report 534, Archaeological and Historical, Eastern Washington University.
<input type="checkbox"/>	CH2M Hill. 1992. Feasibility study report, joint culture facilities for the resident fish substitution program on the Snake River above Hells Canyon in Idaho. CH2M Hill, Boise, ID
<input type="checkbox"/>	Gresswell, R.E. 1995. Yellowstone cutthroat trout. In M.K. Young (ed.) Conservation assessment of inland cutthroat trout. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. General Technical RM-GTR-256.
<input type="checkbox"/>	May, B.E. 1996. Yellowstone cutthroat trout <i>Oncorhynchus clarki bouvieri</i> . Pages 11-34 in D.A. Duff, (ed). Conservation assesement for inland cutthroat trout. U.S. Forest Service, Intermountain Region, Ogden, Utah
<input type="checkbox"/>	Montgomery Watson. 1996. The Shoshone-Bannock and Shoshone-Paiute Tribes master plan for the Fort Hall resident fish hatchery, Montgomery-Watson, 671 Riverpark Lane, Suite 200, Boise, ID.
<input type="checkbox"/>	R.J. Stuber, B.D. Rosenlund, and J.R. Bennett. 1988. Greenback cutthroat trout recovery program: management overview. American Fisheries Society, 4: 71-74.
<input type="checkbox"/>	Stickney, R.R. 1994. Use of hatchery fish in enhancement programs.

	Fisheries, Vol. 19, No. 5: 6-13.
<input type="checkbox"/>	Stumpff, W.K. and D.E. Cowley. 1997. Trials and tribulations in brood stock development for Rio Grande cutthroat trout. Wild Trout IV, 149-152.
<input type="checkbox"/>	Thurrow, R.F., C.E. Corsi, and V.K. Moore. 1988. Status, ecology, and management of Yellowstone cutthroat trout in the Upper Snake River drainage, Idaho. American Fisheries Society Symposium, 4:25-36.
<input type="checkbox"/>	BPA. 1998. Upper Snake River Fish Culture Facility, Environmental Assessment. DOE/EA-1213, Bonneville Power Administration, PO Box 3621, Portland, OR 97208
<input type="checkbox"/>	Varley, J.D. and R.E. Gresswell. 1988. Ecology, status, and management of the Yellowstone cutthroat trout. American Fisheries Society, 4: 13-24.

PART II - NARRATIVE

Section 7. Abstract

Streams on the Fort Hall Reservation have suffered from years of livestock grazing and rapid flooding and drafting of American Falls Reservoir. In addition to physical habitat damage, fish stocks have been negatively affected by genetic introgression, competition with non-native fishes, and exploitation. An effort to restore Reservation streams and riparian areas was begun in 1992 (Habitat Restoration/Enhancement Fort Hall Reservation; #9201000) and has been successful in 1) stabilizing streambanks, 2) producing areas of clean gravel, 3) deepening stream channels, and 4) increasing biomass and densities of salmonids. The restoration project currently addresses one limiting factor in the recovery of Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*), specifically physical habitat conditions to maintain a self-perpetuating fishery. The goal of this project is to address problems stemming from hybridization with hatchery rainbow trout (*Oncorhynchus mykiss*), and competition with non-native brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). The specific objectives of the joint culture facility are to produce native Yellowstone cutthroat trout, redband trout, and domestic rainbow trout. Domestic rainbow trout will be produced for put-and-take fisheries in enclosed reservoirs for recreational and subsistence opportunities and to ease fishing pressure on native fish stocks. Native fish will be used to re-establish stocks negatively affected by hybridization, habitat loss, and exploitation. Measures for establishing Shoshone-Bannock and Shoshone-Paiute fish production facilities have been a part of the Councils program since 1987. Techniques used in this project will be similar to those used in efforts to restore the greenback cutthroat trout (*Oncorhynchus ckarki stomias*) in Colorado. All phases of this project will be monitored intensively before and after the project successfully creates self sustaining native fish populations on Reservation streams.

Section 8. Project description

a. Technical and/or scientific background

The distribution and abundance of Yellowstone cutthroat trout have declined in the Snake River Plain of Idaho through habitat degradation, genetic introgression, and exploitation (Thurrow et al. 1988; May 1996). The use of hatcheries in conjunction with habitat improvement and other measures has been shown to be successful in re-introducing the greenback cutthroat trout in Colorado (Stuber et al. 1988; Dwyer and Rosenlund 1988). The Yellowstone cutthroat trout has recently been petitioned for listing under the Endangered Species Act (14 August 1998) and is estimated to occupy less than 10% of its historical habitat (Varley and Gresswell 1988). Restoration and protection of streams is a first step in the recovery of native fishes. The second step involves re-introduction of seed stock to establish self perpetuating populations in areas historically but no longer occupied. Remaining populations of Yellowstone cutthroat have been geographically isolated and problems with habitat degradation and fragmentation on mainstem watercourses has made colonization by natural means problematic if not impossible (Gresswell 1995). May (1996) discussed the importance of increasing the number of pure populations of Yellowstone cutthroat and expanding the distribution within historic range through repeated introductions of genetically pure individuals.

Much of the scrutiny that has been focused on hatcheries in the past ten years is valid and is a direct outcome of past hatchery practices, specifically, outplanting non-native or genotypically/phenotypically dissimilar populations in areas already containing weak but “pure” native populations of fishes (see Stickney 1994). Broodstock used in this project will be collected locally to avoid any problems with introduction of genetic material from distinct metapopulations. This project along with others in Colorado (Stuber et al. 1988; Dwyer and Rosenlund 1988) and New Mexico (Stumpff and Cowley 1997) aim to re-introduce native cutthroat trout into “empty” habitats. Moreover, concerns related to weakening of genetic stocks are not an issue in this and similar projects because native fishes have not occupied these habitats for many years. Re-introduction programs are relatively new and many of the techniques used in this hatchery (i.e. experimentation with feed, cover, etc.) and during outplanting (i.e. hatchboxes, life stage at release) will be experimental and based upon communication with peers involved in similar projects.

b. Rationale and significance to Regional Programs

The systemwide goal of the Fish and Wildlife Program (1994), “a healthy Columbia Basin”, is noble and necessary, but cannot in truth succeed if native fishes are not present to re-colonize restored habitat. The westslope, Bonneville, and Yellowstone cutthroat trout have all been petitioned for listing in the last few years, warranting measures aimed at re-introduction of fish to historically occupied areas. Genetic introgression from domestic non-native rainbow trout has all but extirpated pure strains of Yellowstone cutthroat on Reservation streams. Remaining pure populations must be used to rebuild stocks before further losses to hybridization occur.

This project addresses section 7.2 (F&WP 1994), “improve existing hatchery production,” through innovative broodstock programs and focusing production on low numbers of genetically healthy fish rather than high numbers of genetically non-distinct fish. This project also addresses section 7.4A, as a new production facility for restoration

of native fishes. Section 7.4B states that master plans should be developed, this measure was addressed in 1996 with publication of the Joint Culture Facility Master Plan (Montgomery-Watson). Section 7.4D stresses the importance of captive broodstock programs based on sound scientific principles. Experimentation with maintenance of captive broodstock has always been an integral part of this project. This project addresses the principles of the Fish and Wildlife Program (1994) as outlined in section 10.1A. Section 10.1A calls for protection, mitigation, and enhancement of resident fish populations affected by construction and operation of dams. This project will identify and protect the few native pure populations that still exist on the Fort Hall Reservation and provide seed stock for re-introduction of fishes to areas historically occupied. Section 10.1B accords the highest priority, rebuilding to sustainable levels weak, but recoverable, native populations. This project addresses this measure by rebuilding populations of native fish in empty yet healthy streams. In addition to general policies of the Fish and Wildlife Program, the Joint Culture Facility is directly referenced as measure 10.3E.9; “acquire or construct a trout production facility for the production of native trout species for stocking on the Fort Hall Reservation...”, and 10.3E.11 which provides funding for this project.

c. Relationships to other projects

This project is linked to the Shoshone-Bannock Habitat Restoration/Enhancement Fort Hall Reservation (#9201000). Habitat restoration/enhancement and protection is aimed at providing suitable conditions for self-perpetuating populations of native Yellowstone cutthroat trout on the Fort Hall Reservation. The hatchery is needed for re-introduction of native fishes into streams affected by hybridization, habitat loss, and exploitation. Hatcheries have undergone increased scrutiny in the past few years because of concerns related to genetic integrity of distinct populations (i.e. ESU's). More than ten projects funded in 1999 focused on either genetic inventories, inventories of listed fish species populations, or hatcheries modified for supplementation or re-introduction of native fishes.

d. Project history (for ongoing projects)

In 1992 a feasibility study (CH2M Hill) was completed outlining options for production of native fishes for re-introduction on the Fort Hall Reservation. Several options were considered including; renting hatchery space, contracting fish production, and building a new hatchery to be managed by the Tribes. Purchase of a new hatchery was the preferred alternative because of concerns with diseases, water supply quality and quantity, and control of all parameters related to production. In 1996 a master plan (Montgomery-Watson) was written which outlined program requirements and three possible sites for construction of a new hatchery. A site was selected and in 1998 an Environmental Assessment (FONSI) (BPA) was completed for phases I and II of the project and included a cultural resources review (Emerson and Boreson 1997). Phases I and II include production of domestic rainbow trout for stocking in enclosed reservoirs and maintenance of native broodstock and limited production of native Yellowstone cutthroat and redband trout. Phase III of the project will undergo an additional EA and will be

completed before large scale re-introduction of native fishes in reservation waters. The Northwest Power Planning Council approved the project in 1998 after an Independent Scientific Review of the project and review of a set of questions answered by Joint Culture Facility proponents. Water quality and quantity were monitored at the proposed hatchery site (Houghland Farms) and the property was purchased by BPA in 1998. The land will be transferred in trust to the Shoshone-Bannock and Shoshone Paiute Tribes in either late 1998 or early 1999. Program Verification of Biological Criteria are currently being completed and design and engineering of the facility should be completed by late spring of 1999.

e. Proposal objectives

Objectives

- 1: Identify pure populations of Yellowstone cutthroat trout and redband trout on the Fort Hall and Duck Valley Reservations, respectively.
- 2: Protect habitat containing remaining pure populations of redband and/or Yellowstone cutthroat trout.
- 3: Collect baseline data on characteristics of streams with remnant populations of native fishes.
- 4: Select streams for re-introduction of native fishes.
- 5: Collect broodstock or gametes from those populations identified as being genetically pure Yellowstone Cutthroat trout and/or redband trout.
- 6: Produce Yellowstone cutthroat, redband, and domestic rainbow trout. 48,000 10" domestic rainbow catchables produced yearly for put-and-take fisheries in enclosed reservoirs. 350,000 eyed Yellowstone cutthroat eggs, and 8,000 10" catchables produced yearly. 350,000 eyed redband eggs produced yearly.
- 7: Outplant domestic rainbow trout to enclosed terminal reservoirs. Specific objective: Two put-and-take rainbow fisheries on Fort Hall and Duck Valley Reservations.
- 8: Outplant eyed eggs to hatchboxes in select streams on the Fort Hall and Duck Valley Reservations. Specific objective: 20 self sustaining populations of native Yellowstone cutthroat and redband trout on Fort Hall and Duck Valley reservations.

f. Methods

Objectives 1-4

Identification and Maintenance of Pure Populations

Surveys will be performed to identify pure populations of cutthroat trout and redband trout on the Fort Hall and Duck Valley Reservations, respectively. Initial surveys will involve snorkeling or electrofishing for presence of pure strain cutthroat trout. Sixty plus streams will be surveyed for presence of pure strains of Yellowstone Cutthroat trout and/or redband trout. Non-lethal tissue samples (15-20 fish per population) will be collected from those populations judged phenotypically pure and sent for analysis to a genetics laboratory. Fish will be collected and genetically analyzed using intron analysis. Purity will be judged by comparison with confirmed reference samples. Habitat containing pure populations of redband and/or cutthroat trout will be protected by changes in grazing practices (i.e. rest rotation), fencing, and habitat enhancement projects. Baseline data will be collected on characteristics of streams with remnant populations of native fishes (i.e. habitat types, pool-riffle ratios, slope, aspect, temperature, canopy, etc.) This information will be used when selecting streams for re-introduction of cutthroat and/or redband trout.

Objective 5

Collection of Broodstock

Broodstock or gametes will be collected from those populations identified as being genetically pure Yellowstone cutthroat trout and/or redband trout. Broodstock will be collected from multiple sources if possible to reduce problems with low levels of genetic variation in small remnant populations. Initial collections of Yellowstone cutthroat and/or redband trout will include at least 60 pairs and preferably 160 pairs of fish from multiple populations (Montgomery Watson 1996). Gametes will be collected if numbers of fish in remnant populations are low and there is any possibility of damaging the integrity of a remnant populations through collection of wild broodstock. Gametes would be collected by electrofishing or at a weir. A random selection of spawners will be collected in direct proportion to natural populations.

Objective 6

Produce Yellowstone cutthroat, redband, and domestic rainbow trout.

48,000 10" domestic rainbow catchables produced yearly for put-and-take fisheries in enclosed reservoirs. 350,000 eyed Yellowstone cutthroat eggs, and 8,000 10" catchables produced yearly. 350,000 eyed redband eggs produced yearly.

Disease Prevention

Every precaution will be taken to eliminate the risk of whirling disease. Fish will be tested before introduction to the hatchery and before release into the wild. Fish will be held at a separate facility while testing is done.

Monitoring will follow standard hatchery protocols for detection of fish diseases within the hatchery confines, testing of outgoing fish for disease, and testing of incoming fish for disease. Disease testing will occur on site and offsite by either state personnel or other qualified personnel. The following measures will be taken to prevent outbreaks of disease on and off the hatchery site:

Fish Health Management

- Fish tested on a regular basis for disease.
- Incoming and outgoing fish and gametes tested for disease
- Separation of domestic and native fish raceways and water supplies (i.e. natives upstream).
- Separation of broodstock from fish and eggs, (i.e. terminal raceways)
- Proper raceway/pond loading density for broodstock and hatchery rainbows
- Disinfection and cleaning of raceways with PVP iodine
- Drip applicators at heads of raceways for rapid response to disease outbreaks
- Minimization of handling stress
- Monitoring of fish behavior (i.e. flashing), DO, temperature, and ammonia levels in water
- Testing of new fish and eggs entering hatchery for disease and/or genetic health
- Monitor growth indices at all life stages using organosomatic index and K-factors

Project Disinfection

- All gravel removed and ponds flushed and disinfected.
- Liners added to raceways (if necessary), flushed, and disinfected with PVP iodine or chlorine mix.

Raceways

- Separate wild fish from domestic portions with fencing.
- Prevent disease transmission, disinfection of nets, waders, etc. on a regular basis.

Wastewater Treatment

- Cleaning waste drained to a rotary drum
- Remove collected filtered solids < 30 microns
- Collected solids pumped to a storage area
- Solids disposed of on site

Genetics

In addition to disease monitoring, genetic integrity of Yellowstone cutthroat trout and redband trout eggs will be monitored on a regular basis. Techniques used will include electrophoresis and/or intron analysis.

To preserve genetic diversity new disease free gametes (milt) will be brought into the hatchery yearly at a rate of 20-30%. In addition, sperm cryopreservation may be utilized to preserve genetic health of hatchery broodstock.

Diseased eggs and/or adults as well as genetically inferior eggs or adults would be destroyed on site. The following measures will be implemented to maintain genetics of hatchery broodstock (Table 1);

Genetic Management

- Random selection (broodstock collection mating)
- No pooling of milt
- Use spawners in direct proportion to population
- Rotational line crossing
- Sperm cryopreservation
- 20-30% wild gametes (milt) yearly

Objective 7

Put-And-Take Fisheries

Domestic rainbow trout will be tested for disease before transportation to release sites (28,000→Duck Valley Reservation; 10,000→Fort Hall Reservation). Fish will be marked (i.e. fin clip) before release into enclosed terminal waterbodies on the Fort Hall and Duck Valley Reservation.

- Two “put-and-take” rainbow fisheries will be established in enclosed waters on the Fort Hall Reservation.
- Two “put-and-take” rainbow fisheries will be established in enclosed waters on the Duck Valley Reservation.

New populations will be monitored yearly (snorkeling and/or electrofishing) to document survival, growth, and reproduction

Areas surrounding domestic rainbow releases will be monitored (snorkeling or electrofishing) post release for any evidence of fish escaping the enclosed fisheries. Tribal employees will monitor put-and-take fisheries with creel surveys to ascertain success of the stocking programs and reduction of fishing pressure on native stocks.

Objective 8

Hatchboxes – Native Fishes

The first step in reintroduction will involve finding suitable habitats that have natural barriers for prevention of re-invasion of non-native fishes or areas with little risk of

genetic introgression from domestic rainbow trout. Hatchboxes will be used to outplant native Yellowstone cutthroat (350,000 eggs) and redband trout (350,000 eggs). Hatchboxes will be placed in areas where springs or some other source of clean cold water is available. Eyed eggs will be placed in hatchboxes in spring. Boxes will be maintained and mortality will be monitored on a daily basis.

- 20 self-sustaining populations of “pure” Yellowstone cutthroat trout will be established on the Fort Hall Reservation
- 20 self-sustaining populations of “pure” redband trout will be established on the Duck Valley Reservation

Re-introductions will be monitored to determine when self-sustaining populations (> 300 spawning pairs yearly) have been established. New populations will be monitored yearly (snorkeling and/or electrofishing) to document survival, growth, and reproduction. Samples will be collected from new populations (fin clips from 20 to 30 fish) two to five years to ascertain genetic health (Table 2).

Table 1. Schedule of physical and biological parameter monitoring within the Joint Culture Facility. More than one X in temporal regimes indicates intensity of sampling related to observation of fish behavior, mortality, or other factors.

<i>Parameter</i>	<i>Daily</i>	<i>Weekly</i>	<i>Monthly</i>	<i>Annually</i>
Physical				
Temperature	X			
Dissolved Oxygen	X			
pH	X			X
Particulate Solids	X			X
Alkalinity		X		X
Ammonia		X		X
Carbon Dioxide			X	X
Hardness				X
Heavy Metals				X
Nitrite		X		X
Hydrogen Sulfide		X		
Flow		X		
Biological				
Fish Behavior	X		X	
Mean Length Increase			X	
Mean Body Weight Increase			X	
Biomass Increase			X	
Condition Factor Change			X	
Length Variation			X	
Body Weight Variation			X	
Feed Conversion Ratio		X	X	
Disease	X	X	X	X
Morphometrics/Appearance	X			X
Genetics				X

Table 2. Schedule of physical and biological parameter monitoring in streams slated for reintroduction. More than one X in temporal regimes indicates some parameters may be sampled annually but analysis of long term trends is of primary importance.

<i>Parameter</i>	<i>Monthly</i>	<i>Annually</i>	<i>2-5 years</i>
Physical			
Temperature	X		
Dissolved Oxygen	X		
pH	X		
Conductivity	X		
Flows	X	X	
Depth			X
Bank Composition/Stability			X
Channel Sediment Profiles			X
Surface Area			X
Pool-Riffle Ratios			X
Mesohabitat Areas			X
Substrate composition			X
Cover Area/Composition			X
Biological			
Fish Genetic Health		X	X
Fish Population/Biomass	X	X	
Natural Production	X	X	
Invertebrate/Density Composition		X	
Riparian Vegetation Composition		X	
Riparian Vegetation Coverage		X	
Instream Vegetation Coverage		X	

g. Facilities and equipment

Overview

Hatchery facilities are projected to be completed by the end of fiscal year 1999. Delays in construction or initiation of construction may extend hatchery completion date. All equipment and building space for initial surveys of native Yellowstone cutthroat trout are currently available at the Shoshone-Bannock Fisheries Dept. A trailer or modular home may be necessary for additional housing/office space.

New Hatchery Building

A new hatchery building is estimated to require 2,900 sq.ft. (32' x 90') to provide for 28, eight-stack Heath-type incubators; sufficient incubation/early rearing raceways (six 3' x 12' x 2' fiberglass troughs, with space for six additional troughs) to meet program requirements; and service spaces. Construction of the new hatchery building would consist of a pre-engineered metal-frame building with a concrete slab on grade foundation. The slab or grade foundation would be designed based on load capacity of the existing soils. Water flow to the facility would be by gravity from artesian wells and springs. The wells and building would be located to take advantage of available slope on the site for gravity flow.

New Feed and Hardware Storage Building

A feed/hardware storage facility will provide food storage requirements; supply space for feed unloading operations; and space allocation for vehicles and other large equipment storage. This facility is currently planned to be a pre-engineered type building of metal-frame construction with concrete slab on a grade separated from the hatchery building.

It is currently estimated that a total area of 750 sq.ft. is required for feed storage (300 sq. ft. for ten pallets) and feed handling (100 sq. ft.). An additional space of approximately 450 sq.ft. should be provided for vehicle storage and covered truck unloading. The total covered area is estimated at a minimum of 1,300 sq.ft. with a covered feed vehicle unloading area.

New Raceways

Twelve 800 cubic feet raceways are proposed in the master plan (6' x 80' x 2.5', approximately 25 to 30 percent/total space of which is lost in influent and effluent plumbing). The raceways are currently planned to be covered by fixed bird netting. However, the unit will be planned and designed for future addition of Quonset-type structures, if the husbandry of redband trout indicate better development in controlled lighting. Raceways will be constructed of concrete, fiberglass, or aluminum, depending on cost and durability factors.

Hydraulic Head Boxes and Gas Transfer

Three hydraulic head boxes will be used as flow splitters and hydraulic head control off each well. Groundwater will be passively treated to remove nitrogen and add oxygen. A pure oxygen-packed column or Michigan-type column will be used. The use of pure oxygen will reduce the nitrogen levels below 100 percent and supersaturate the water with oxygen. Because of seasonal differences in $O_2 + N_1$, the gas transfer system can be designed to operate with either pure oxygen or air.

Liquid Oxygen Tank

A source of pure oxygen will be needed for the aeration/degassing units. A medium pressure, vertical liquid oxygen tank (2,000 gal. to 3,000 gal.) with ambient vaporizers, and a fenced concrete pad will be needed. A two- or three-week supply of liquid oxygen (LOX) should be provided.

Effluent Screening

Screens are proposed for the removal of cleaning solids from the raceway water. These screens are currently proposed to be rotary drum screen filters with a spray backwash system. Solids collected from these screens would require collection and either removal to a local landfill, or incorporation into the Waste Treatment Facility with disposal on near-by Tribe-owned agricultural land.

Effluent treatment ponds would be designed to provide a one-hour detention of the full flow of the facility. This would require a pond of 50' x 50' x 12' (two-foot freeboard), which may be excessive for using gravity flow at this site.

Wastewater Treatment Facility

The extent and type of treatment of the hatchery effluent water necessary prior to discharge into McTucker Creek would be defined by the production of the facility. The current hatchery proposal would utilize off-line treatment of cleaning flow. Cleaning solids would be collected by a decant system off the raceway and separated by microscreening. Solids preferably would be disposed of on appropriate Tribal agricultural land. After treatment water flowing through the raceways would then be directly discharged into McTucker Creek meeting all Clean Water Act standards.

Access Roads

A new access road will be required for the site. It is recommended that this road be constructed at least 24' in width, and asphalt-surfaced. A secondary (gravel) access road system will be provided around the raceways. Soil conditions will require geotechnical investigation prior to design of all road and building systems. In future, a truck may be necessary for hauling catchables to stoking sites on the Fort Hall and Duck Valley Reservations

h. Budget

The budget for personnel includes monies for one FTE and two part time employees to implement the genetic inventory of fishes and surveys of streams on the Fort Hall Reservation (\$54,000). This is the minimum amount of personnel to initially implement the project. Fringe and indirect costs associated with personnel are based on costs from past budgets approved by the Shoshone-Bannock Tribes (\$38,621). Supplies, materials, and non-expendable property, including; hatchery supplies, office supplies, and gas & oil are the minimum necessary to get the hatchery up and running (\$61,000). Operations and maintenance funds (\$61,000) are needed for feed, power, oxygen and other expendables necessary for operation of the hatchery. Money is budgeted for travel to professional meetings and workshops (\$3,000). Attendance at peer sponsored meetings is critical for exchange and dissemination of ideas about innovative hatchery practices geared toward native fish production. A pickup lease (\$5,000) is necessary for travel to and from restoration sites and local meetings. Monies are needed for subcontracting genetic work to the University of Montana (\$60,000)

Section 9. Key personnel

Three FTE and two part time personnel will be hired to operate all phases of the project, including collection of broodstock, maintenance of broodstock, production, and outplanting of fishes. A qualified hatchery manager and qualified hatchery technicians will be hired to operate the facility. Paul Spruell, Division of Biological Sciences, University of Montana will be contracted to do the genetic analysis of native fishes. Currently David C. Moser is responsible for implementing this project, resume follows:

Résumé

David C. Moser
875 Renee Ave.
Pocatello, ID 83201
Phone: 208-234-2991
E-mail: rezfish@poky.srv.net

Education

Bachelor of Science, Humboldt State University, 1989.

Major: Freshwater Fisheries

Major Advisor: Terry Roelofs, Ph.D.

Master of Science, Idaho State University, 1993.

Major: Aquatic Ecology

Major Advisor: G. Wayne Minshall, Ph.D.

Experience

Most recent experience:

Resident Fisheries Biologist/Program Manager. Position in Resident Fisheries Program (RFP) responsible for soliciting, implementing, and maintaining Bonneville Power Administration and other contracts; planning biologically sound long-range fisheries restoration programs on and off the Fort Hall Reservation; assist in managing fishery resources, personnel, budgets, and equipment, under the RFP Coordinator. Technical consultant during the Bear River FERC re-licensing process. Compiled, analyzed, and wrote annual resident fish reports for the Bonneville Power Administration and the Bureau of Indian Affairs in 1996 and 1997.

Fisheries Field Biologist for the Shoshone-Bannock Tribes. Responsible for implementation and maintenance of the resident fisheries program on the Fort Hall Indian Reservation. Duties included; supervision of field crews ranging from 5-20 technicians and Salmon Corps personnel. Collection and analysis of fish population data using electrofishing equipment (boat and backpack) and snorkeling. Measurement of sediment levels and changes in channel characteristics of project streams. Measurement of water quality parameters, including; DO, Total Dissolved Solids, Conductivity, and pH. Collection and analysis of invertebrate data. Stabilization of eroding banks using sloping, revetment and re-vegetation techniques. Participated in Blackfoot and Portneuf Watershed Council meetings.

Publications and Presentations

Moser, D.C. and G.W. Minshall. 1996. Effects of Localized Disturbance on Macroinvertebrate Community Structure in relation to Mode of Colonization and Season. Am. Midl. Nat. 135:92-101.

Moser, D.C. And C.G. Colter. 1997. Fort Hall Reservation Stream Enhancement: Shoshone-Bannock Tribes 1997 Annual Report to Bonneville Power Administration, Project 92-10, Portland, OR.

Moser, D.C. 1998. Fort Hall Reservation Stream Enhancement: Shoshone-Bannock Tribes 1998 Annual Report to Bonneville Power Administration, Project 92-10, Portland, OR.

Section 10. Information/technology transfer

Information/technology transfer will be provided through annual reports and presentations at professional society meetings.

Congratulations!